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National Eutrophication Survey, Las Vegas, Nev

Prepared for

Environmental Monitoring and Support Lab, Las Vegas, Nev

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NATIONAL EUTROPHICATION SURVEY

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Report
on
Greer's Ferry Reservoir
Van Buren and Cleburne Counties
Arkansas

EPA Region VI

Working Paper No. 487

With the cooperation of the

Arkansas Department of Pollution

Control and Ecology

and the

Arkansas National Guard

January, 1977

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16. ABSTRACT

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

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REPORT ON GREER'S FERRY RESERVOIR

VAN BUREN AND CLEBURNE COUNTIES, ARKANSAS

EPA REGION VI

by

National Eutrophication Survey

Water and Land Monitoring Branch
Monitoring Applications Laboratory
Environmental Monitoring & Support Laboratory
Las Vegas, Nevada

and

Special Studies Branch
Corvallis Environmental Research Laboratory
Corvallis, Oregon

Working Paper No. 487

OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY

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FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to freshwater lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point source discharge reduction and nonpoint source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's freshwater lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by the U.S. Environmental Protection Agency and to augment plans implementation by the states.

ACKNOWLEDGMENTS

The staff of the National Eutrophication Survey (Office of Research and Development, U.S. Environmental Protection Agency) expresses sincere appreciation to the Arkansas Department of Pollution Control and Ecology for professional involvement, to the Arkansas National Guard for conducting the tributary sampling phase of the Survey, and to those Arkansas wastewater treatment plant operators who provided effluent samples and flow data.

The staff of the Water Division of the Arkansas Department of Pollution Control and Ecology provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports and provided critiques most useful in the preparation of this Working Paper series.

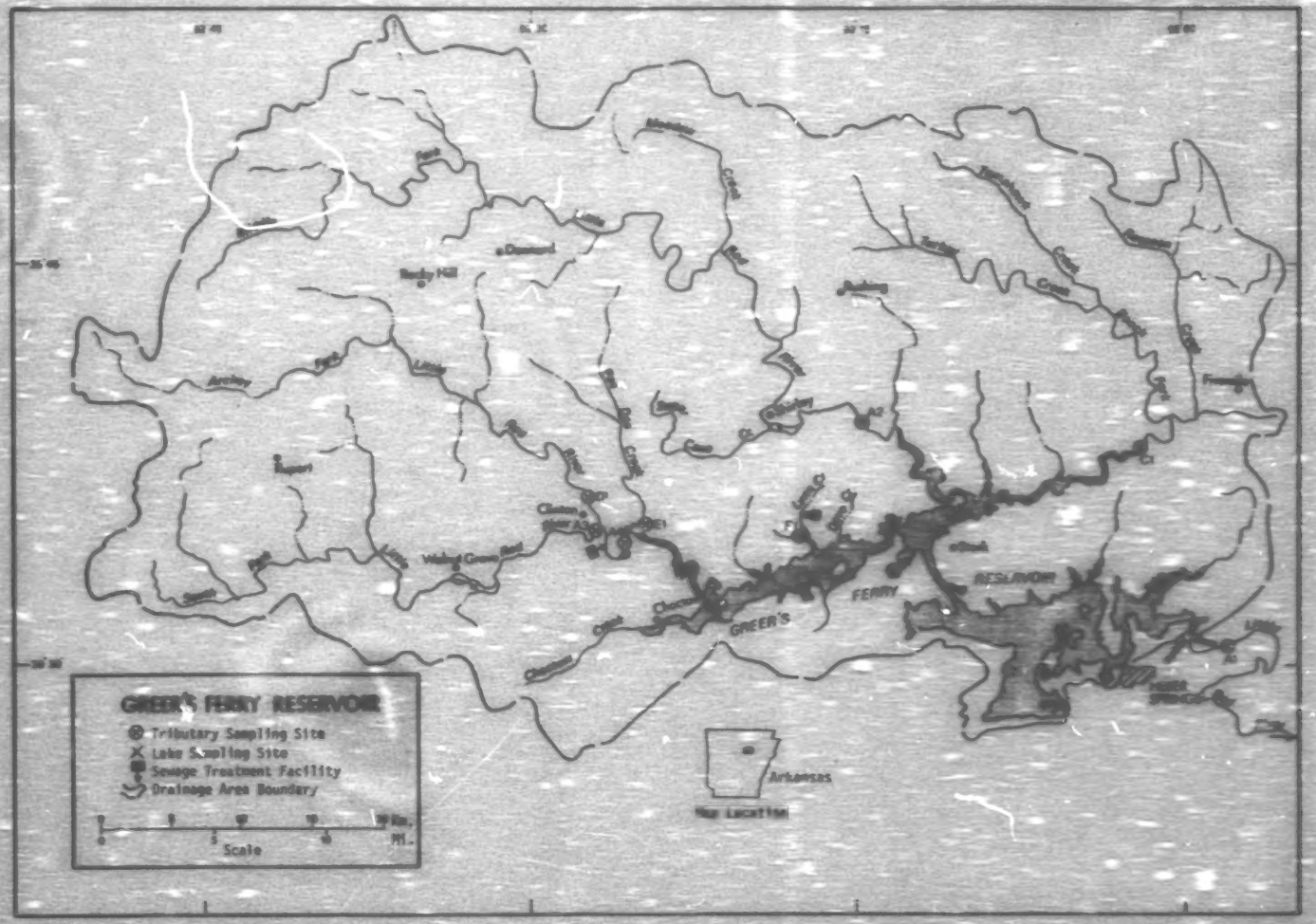
Major General Thomas C. Armstrong, the Adjutant General of Arkansas, and Project Officer Colonel Lavaun M. James, who directed the volunteer efforts of the Arkansas National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF ARKANSAS

LAKE NAME	COUNTY
Beaver	Benton, Carroll, Washington
Blackfish	Crittenden, St. Francis
Blue Mountain	Logan, Yell
Bull Shoals	Baxter, Boone, Marion (Taney, Ozark in MO)
Catherine	Garland, Hot Spring
Chicot	Chicot
DeGray	Clark, Hot Spring
Erling	Lafayette
Grand	Chicot
Greer's Ferry	Van Buren, Cleburne
Hamilton	Garland
Millwood	Hempstead, Howard, Little River, Sevier
Nimrod	Perry, Yell
Norfork	Baxter, Fulton (Ozark in MO)
Ouachita	Garland, Montgomery
Table Rock	Boone, Carroll (Barry, Taney in MO)


GREER'S FERRY RESERVOIR
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Facility
Drainage Area Boundary
Scale
Km.
Mi.
Arkansas
Map Location
GREER'S
FERRY
RESERVOIR

REPORT ON GREER'S FERRY RESERVOIR, ARKANSAS

STORET NO. 0516

I. CONCLUSIONS

A. Trophic Condition:*

Based upon field observations and Survey data, Greer's Ferry Reservoir is considered mesotrophic. Potential for primary production as indicated by algal assay control yield was low. Chlorophyll a values ranged from a low of 1.8 µg/l in the spring to a high of 8.4 µg/l in the summer with a mean of 5.0 µg/l. The mean Secchi disc reading for the lake was 322 cm (127 inches). Of the 16 Arkansas lakes sampled in 1974, 15 had greater median total phosphorus values, 10 had greater median inorganic nitrogen levels, and 13 had greater median dissolved orthophosphorus levels than Greer's Ferry Reservoir.

Survey limnologists reported no problem algal blooms or macrophyte growths in the reservoir. However, Greer's Ferry Reservoir does have localized problem areas of enrichment attributable to both runoff from developed areas having inadequate treatment facilities, and agricultural runoff. The Arkansas Department of Pollution Control and Ecology (1971) has reported a number of locations on the lake where coliform bacteria counts exceed State Health Department limits for outdoor bathing areas.

*See Appendix E

B. Rate-Limiting Nutrient:

Algal assay results indicate that Greer's Ferry Reservoir is limited by available phosphorus. Spikes with phosphorus alone or nitrogen and phosphorus simultaneously resulted in increased assay yields. The addition of nitrogen alone did not produce a growth response. The ratios of total available nitrogen to orthophosphorus (N/P) in the lake data suggest nitrogen limitation in the spring and phosphorus limitation in the summer and fall.

C. Nutrient Controllability:

1. Point sources -

The mean annual phosphorus load from point sources was estimated to be 10.2% of the total load reaching Greer's Ferry Reservoir. The city of Clinton wastewater treatment plant contributed 8.3% of the total load.

The present phosphorus loading of 0.24 $g/m^2/yr$ for Greer's Ferry Reservoir is less than that proposed by Vollenweider (1975) as an oligotrophic loading (see Section IV-F). Every effort should be made to reduce the known phosphorus inputs to the greatest practicable extent in order to protect the existing high quality of the lake.

2. Nonpoint sources -

Nonpoint sources contributed 89.8% of the phosphorus load reaching Greer's Ferry Reservoir. Measured tributaries accounted for 52.2% of the total phosphorus load and the ungaged tributaries were estimated to contribute 30.2% of the load.

Loading calculations based upon available nutrient concentrations yield a net export of nitrogen from the reservoir, indicating that sampling was not adequate to depict actual loading and/or export rates of that nutrient.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS

Lake and drainage basin characteristics are itemized below. Lake surface area and mean depth were provided by the Arkansas Department of Pollution Control and Ecology. Lake maximum depth was estimated from National Eutrophication Survey (NES) data. Tributary flow data were provided by the Arkansas District Office of the U.S. Geological Survey (USGS). Outlet drainage area includes the lake surface area. Mean hydraulic retention time was obtained by dividing the lake volume by the flow of the outlet. Precipitation values are estimated by methods as outlined in NES Working Paper No. 175. A table of metric/English conversions is included as Appendix A.

A. Lake Morphometry:

1. Surface area: 163.90 km^2.
2. Mean depth: 21.4 meters.
3. Maximum depth: 61.0 meters.
4. Volume: 3,507.922 x 10^6 m^3.
5. Mean hydraulic retention time: 820 days (2.2 years).

B. Tributary and Outlet:
(See Appendix B for flow data)

1. Tributaries -

Name	Drainage area (km^2)	Mean flow (m^3/sec)
A-2 Middle Fork Little Red River	800.3	13.54
A-3 South Fork Little Red River	375.5	6.32
D-1 Archey Creek	305.6	4.99
E-1 Pee Dee Creek	85.0	1.37
Minor tributaries and immediate drainage -	1,255.9	23.44
Totals	2,822.3	49.66

2. Outlet - A-1 Little Red River 2,986.3 49.52

C. Precipitation:

1. Year of sampling: 152.2 cm.
2. Mean annual: 149.6 cm.

III LAKE WATER QUALITY SUMMARY

Greer's Ferry Reservoir was sampled four times during the open-water season of 1974 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from four stations on the lake and from a number of depths at each station (see map, page v). During each visit, depth-integrated samples were collected from each station for chlorophyll a analysis and phytoplankton identification and enumeration. During the first and last visits, 18.9-liter depth-integrated samples were composited for algal assays. Maximum depths sampled were 59.4 meters at Station 01, 39.6 meters at Station 02, 30.5 meters at Station 03 and 16.8 meters at Station 04. For a more detailed explanation of NES methods, see NES Working Paper No. 175.

The results obtained are presented in full in Appendix I and are summarized in III-A for waters at the surface and at the maximum depth for each site. Results of the phytoplankton counts and chlorophyll a determinations are included in III-B. Results of the limiting nutrient study are presented in III-C.

GREER'S LAKE
STORET CODE 0516

PHYSICAL AND CHEMICAL CHARACTERISTICS

PARAMETER	(3/27/74) S*** = 4 N*	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)	(6/ 5/74) S*** = 4 N*	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)	(9/ 3/74) S*** = 4 N*	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)
TEMPERATURE (DEG CENT)												
0.-1.5 M DEPTH	6	10.4- 13.9	11.4	0.0- 1.5	8	24.0- 24.7	24.1	0.0- 1.5	5	25.3- 28.3	25.7	0.0- 1.5
MAX DEPTH**	4	7.7- 9.9	7.8	12.2- 57.9	4	8.4- 13.8	9.3	16.8- 59.4	4	9.4- 23.8	10.8	13.1- 45.7
DISSOLVED OXYGEN (MG/L)												
0.-1.5 M DEPTH	2	10.4- 10.8	10.6	1.5- 1.5	4	6.0- 6.6	6.4	1.5- 1.5	5	6.8- 7.6	6.8	0.0- 1.5
MAX DEPTH**	4	7.8- 9.4	9.4	12.2- 57.9	4	1.6- 6.4	5.5	16.8- 59.4	4	0.4- 1.2	0.8	13.1- 45.7
CONDUCTIVITY (UMHOS)												
0.-1.5 M DEPTH	6	29.- 35.	33.	0.0- 1.5	8	32.- 46.	44.	0.0- 1.5	5	32.- 41.	37.	0.0- 1.5
MAX DEPTH**	4	23.- 38.	31.	12.2- 57.9	4	31.- 48.	35.	16.8- 59.4	4	29.- 56.	51.	13.1- 45.7
PH (STANDARD UNITS)												
0.-1.5 M DEPTH	6	6.5- 7.6	6.8	0.0- 1.5	8	6.7- 7.5	7.3	0.0- 1.5	5	6.7- 6.9	6.7	0.0- 1.5
MAX DEPTH**	4	6.3- 6.4	6.4	12.2- 57.9	4	6.2- 6.6	6.4	16.8- 59.4	4	6.5- 6.5	6.5	13.1- 45.7
TOTAL ALKALINITY (MG/L)												
0.-1.5 M DEPTH	6	10.- 15.	12.	0.0- 1.5	8	13.- 23.	19.	0.0- 1.5	5	19.- 24.	22.	0.0- 1.5
MAX DEPTH**	4	13.- 16.	15.	12.2- 57.9	4	13.- 23.	19.	16.8- 59.4	4	21.- 42.	33.	13.1- 45.7
TOTAL P (MG/L)												
0.-1.5 M DEPTH	6	0.010-0.019	0.016	0.0- 1.5	8	0.000-0.015	0.012	0.0- 1.5	5	0.010-0.017	0.014	0.0- 1.5
MAX DEPTH**	4	0.013-0.038	0.015	12.2- 57.9	4	0.007-0.025	0.020	16.8- 59.4	4	0.025-0.060	0.032	13.1- 45.7
DISSOLVED ORTHO P (MG/L)												
0.-1.5 M DEPTH	6	0.013-0.014	0.013	0.0- 1.5	8	0.002-0.010	0.002	0.0- 1.5	5	0.003-0.004	0.003	0.0- 1.5
MAX DEPTH**	4	0.014-0.015	0.014	12.2- 57.9	4	0.002-0.010	0.002	16.8- 59.4	4	0.003-0.020	0.006	13.1- 45.7
NO2+NO3 (MG/L)												
0.-1.5 M DEPTH	6	0.090-0.130	0.120	0.0- 1.5	8	0.030-0.070	0.055	0.0- 1.5	5	0.020-0.060	0.030	0.0- 1.5
MAX DEPTH**	4	0.090-0.160	0.145	12.2- 57.9	4	0.180-0.290	0.230	16.8- 59.4	4	0.020-0.270	0.050	13.1- 45.7
AMMONIA (MG/L)												
0.-1.5 M DEPTH	6	0.030-0.040	0.030	0.0- 1.5	8	0.020-0.040	0.030	0.0- 1.5	5	0.030-0.060	0.040	0.0- 1.5
MAX DEPTH**	4	0.030-0.080	0.045	12.2- 57.9	4	0.020-0.060	0.040	16.8- 59.4	4	0.060-0.480	0.380	13.1- 45.7
KJELDAHL N (MG/L)												
0.-1.5 M DEPTH	6	0.200-0.200	0.200	0.0- 1.5	8	0.200-0.480	0.250	0.0- 1.5	5	0.200-0.580	0.380	0.0- 1.5
MAX DEPTH**	4	0.200-0.300	0.200	12.2- 57.9	4	0.200-0.200	0.200	16.8- 59.4	4	0.200-0.680	0.550	13.1- 45.7
SECCHI DISC (METERS)	4	1.8- 4.1	2.6		2	2.4- 3.4	2.9		4	1.0- 4.8	4.1	

* N = NO. OF SAMPLES
** MAXIMUM DEPTH SAMPLED AT EACH SITE
*** S = NO. OF SITES SAMPLED ON THIS DATE

GREEN'S LAKE
STORET CODE 0516

PHYSICAL AND CHEMICAL CHARACTERISTICS

(10/15/74)

S*** = 4

PARAMETER	No*	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)
TEMPERATURE (DEG CENT)				
0.-1.5 M DEPTH	8	19.8- 21.7	20.5	0.0- 1.5
MAX DEPTH**	4	9.4- 19.3	12.6	15.2- 56.4
DISSOLVED OXYGEN (MG/L)				
0.-1.5 M DEPTH	8	7.6- 8.2	7.7	0.0- 1.5
MAX DEPTH**	4	0.0- 7.0	0.3	15.2- 56.4
CONDUCTIVITY (UMHOS)				
0.-1.5 M DEPTH	8	46.- 55.	49.	0.0- 1.5
MAX DEPTH**	4	46.- 95.	58.	15.2- 56.4
PH (STANDARD UNITS)				
0.-1.5 M DEPTH	8	6.8- 7.5	6.9	0.0- 1.5
MAX DEPTH**	4	6.3- 6.7	6.6	15.2- 56.4
TOTAL ALKALINITY (MG/L)				
0.-1.5 M DEPTH	8	15.- 18.	16.	0.0- 1.5
MAX DEPTH**	4	18.- 40.	26.	15.2- 56.4
TOTAL P (MG/L)				
0.-1.5 M DEPTH	8	0.008-0.020	0.013	0.0- 1.5
MAX DEPTH**	4	0.016-0.135	0.025	15.2- 56.4
DISSOLVED ORTHO P (MG/L)				
0.-1.5 M DEPTH	8	0.002-0.004	0.004	0.0- 1.5
MAX DEPTH**	4	0.003-0.017	0.004	15.2- 56.4
NO2+NO3 (MG/L)				
0.-1.5 M DEPTH	8	0.020-0.020	0.020	0.0- 1.5
MAX DEPTH**	4	0.020-0.110	0.050	15.2- 56.4
AMMONIA (MG/L)				
0.-1.5 M DEPTH	8	0.020-0.060	0.030	0.0- 1.5
MAX DEPTH**	4	0.060-0.730	0.170	15.2- 56.4
KJELDAHL N (MG/L)				
0.-1.5 M DEPTH	8	0.200-0.500	0.250	0.0- 1.5
MAX DEPTH**	4	0.200-1.000	0.300	15.2- 56.4
SECCHI DISC (METERS)				
	4	1.5- 6.1	3.9	

* N = NO. OF SAMPLES
** MAXIMUM DEPTH SAMPLED AT EACH SITE
*** S = NO. OF SITES SAMPLED ON THIS DATE

8. Biological Characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal Units per ml
03/27/74	1. Chroomonas	500
	2. Melosira	500
	3. Cryptomonas	350
	4. Skeletonema	325
	5. Flagellates	225
	Other genera	573
	Total	2,473
06/06/74	1. Tabellaria	1,579
	2. Melosira	486
	3. Chroomonas	202
	4. Cryptomonas	202
	5. Fragillaria	121
	Other genera	326
	Total	2,916
09/03/74	1. Lyngbya	3,098
	2. Chroomonas	313
	3. Microcystis	219
	4. Cryptomonas	188
	5. Flagellates	125
	Other genera	469
	Total	4,412
10/16/74	1. Lyngbya	678
	2. Tabellaria	601
	3. Melosira	290
	4. Dactylococcopsis	58
	5. Centric diatom	39
	Other genera	136
	Total	1,802

2. Chlorophyll *a* -

Sampling Date	Station Number	Chlorophyll *a* (ug/l)
03/27/74	01	2.2
	02	1.8
	03	2.6
	04	2.6
06/06/74	01	2.5
	02	5.2
	03	5.3
	04	8.4
09/03/74	01	2.0
	02	1.9
	03	3.3
	04	5.2
10/16/74	01	2.9
	02	3.0
	03	4.8
	04	6.5

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

a. 03/27/74

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum Yield (mg/l-dry wt.)
Control	0.010	0.177	0.1
0.05 P	0.060	0.177	3.2
0.05 P + 1.0 N	0.060	1.177	19.9
1.00 N	0.010	1.177	0.1

b. 10/16/74

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum Yield (mg/l-dry wt.)
Control	0.005	0.090	0.2
0.05 P	0.055	0.090	1.7
0.05 P + 1.0 N	0.055	1.090	20.1
1.00 N	0.005	1.090	0.3

2. Discussion -

The control yield of the assay alga, Selenastrum capricornutum, indicates that the potential for primary productivity was low in Greer's Ferry Reservoir during the spring and fall sampling periods. The lake was phosphorus limited at those times as indicated by the increased yield of the test alga in response to an addition of orthophosphorus. Spikes with nitrogen and phosphorus simultaneously resulted in maximum yield. Spikes with nitrogen alone did not produce a response significantly beyond the control yield.

The mean N/P ratios were 26/1 in the summer and early fall, and 24/1 in the late fall suggesting phosphorus limitation. The spring ratio of 12/1 indicates nitrogen limitation at that time (an N/P ratio of 14/1 or greater generally reflects phosphorus limitation).

IV. NUTRIENT LOADINGS
(See Appendix D for data)

For the determination of nutrient loadings, the Arkansas National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page v), except for the high runoff months of March and April when two samples were collected. Sampling was begun in June 1974, and was completed in May 1975.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Arkansas District Office of the USGS for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a USGS computer program for calculating stream loadings. Nutrient loads indicated for tributaries are those measured minus known point source loads, if any.

Nutrient loadings for unsampled "minor tributaries and immediate drainage" ("ZZ" of USGS) were estimated by using the mean annual nutrient loads, in $kg/km^2/yr$, at Stations D-1, Archey Creek, and E-1, Pee Dee Creek, and multiplying the means by the ZZ area in km^2.

The operators of the Clinton and Fairfield Bay wastewater treatment plants provided monthly effluent samples and corresponding flow data. Nutrient loads for the Eden Isle wastewater treatment plant were estimated at 1.134 kg P and 3.401 kg N/Capita/yr.

Monthly samples for Fairfield Bay were a composite of three small plants, serving populations of 500, 350, and 100 persons, respectively. Wastes from the #3 plant are disposed of by spray irrigation.

A. Waste Sources:

1. Known municipal -

Name	Population Served*	Treatment*	Mean Flow ($m^3/d \times 10^3$)	Receiving Water
Clinton**	1,029	Trickling Filter	1.712	South Fork Little Red River
Eden Isle	275†	Extended Aeration	0.104***	Greer's Ferry Reservoir
Fairfield Bay (4 plants)	950	Trickling Filter	0.253	Greer's Ferry Reservoir

2. Known industrial - **

*Treatment plant questionnaires. Eden Isle population and treatment provided by the Eden Isle Corporation (personal communication).
**80% of the total waste load to the Clinton STP is contributed by poultry processing.
***Estimated at 0.3785 m^3/capita/day.
†Estimated from 110 residences (215 persons per residence).

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/yr	% of total
a. Tributaries (nonpoint load) -		
A-2 Middle Fork Little Red River	12,110	30.7
A-3 South Fork Little Red River	4,770	12.1
D-1 Archey Creek	2,825	7.2
E-1 Pee Dee Creek	950	2.2
b. Minor tributaries and immediate drainage (nonpoint load) -	11,930	30.2
c. Known municipal STP's -		
Clinton	3,280	8.3
Eden Isle	310	0.8
Fairfield Bay	430	1.1
d. Septic tanks* -	25	0.1
e. Known industrial - (see **, page 14)		
f. Direct precipitation** -	2,870	7.3
Total	39,400	100.0
2. Output - A-1 Little Red River	20,525	
3. Net annual P accumulation -	18,875	

*Estimate based on 32 lakeside residences, 16 parks, and 1 resort.
**Estimated (see NES Working Paper No. 175).

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/yr	% of total
a. Tributaries (nonpoint load) -		
A-2 Middle Fork Little Red River	233,405	25.2
A-3 South Fork Little Red River	132,615	14.3
D-1 Archey Creek	62,950	6.8
E-1 Pee Dee Creek	20,225	2.2
b. Minor tributaries and immediate drainage (nonpoint load) -	278,810	30.0
c. Known municipal STP's -		
Clinton	19,385	2.1
Eden Isle	935	0.1
Fairfield Bay	965	0.1
d. Septic tanks* -	975	0.1
e. Known industrial - (see **, page 14)		
f. Direct precipitation** -	176,945	19.1
Total	927,210	100.0

2. Output - A-1 Little Red River 1,227,040

3. Net annual N export*** - 299,830

*Estimate based on 32 lakeside residences, 15 parks, and 1 resort.
**Estimated (see NES Working Paper No. 175).
***Export probably due to unknown sources and/or sampling error.

D. Mean Annual Nonpoint Nutrient Export by Subdrainage Area:

Tributary	kg P/km^2/yr	kg N/km^2/yr
Middle Fork Little Red River	15	292
South Fork Little Red River	13	353
Archey Creek	9	206
Pee Dee Creek	10	238

E. Mean Nutrient Concentrations in Ungaged Streams:

Tributary	Mean Total P (mg/l)	Mean Total N (mg/l)
C-1 Beech Creek	0.023	0.749
F-1 Unnamed Stream	0.330	4.302

Nutrient concentrations for Beech Creek (C-1) are in line with those found in the gaged tributaries to Greer's Ferry Reservoir. The extremely high nutrient concentrations for Unnamed Stream can be attributed to the location of sampling site F-1, 9.1 meters below the Hidden Valley (Fairfield Bay) sewage treatment plant outfall.

F. Yearly Loadings:

In the following table, the existing phosphorus annual loading is compared to the relationship proposed by Vollenweider (1975). Essentially, his eutrophic loading is that at which the receiving waters would become eutrophic or remain eutrophic; his oligotrophic loading is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic loading would be considered one between eutrophic and oligotrophic.

Note that Vollenweider's model may not apply to lakes with short hydraulic retention times or in which light penetration is severely restricted by high concentrations of suspended solids in the surface waters.

	Total Yearly Phosphorus Loading ($g/m^2/yr$)
Estimated loading for Greer's Ferry Reservoir	0.24
Vollenweider's eutrophic loading	0.60
Vollenweider's oligotrophic loading	0.30

V. LITERATURE REVIEWED

Arkansas Department of Pollution Control and Ecology, Little Rock, Arkansas. 1971. Pollution Control Survey of White River Basin, August - October 1971.

U.S. Environmental Protection Agency. 1975. National Eutrophication Survey Methods 1973-1976. Working Paper No. 175. National Environmental Research Center, Las Vegas, Nevada, and Pacific Northwest Environmental Research Laboratory, Corvallis, Oregon.

Vollenweider, R. A. 1975. Input-Output Models With Special Reference to the Phosphorus Loading Concept in Limnology. Schweiz. Z. Hydrol. 37:53-84.

VI. APPENDICES

APPENDIX A

CONVERSION FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

TRIBUTARY FLOW INFORMATION FOR ARKANSAS 02/02/77

LAKE CODE 0516 GREERS FERRY RESERVOIR

Reproduced from best available copy.

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 2986.3

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
0516A1	2986.3	75.80	72.94	69.97	62.67	46.07	45.79	43.15	45.48	35.57	16.91	36.16	45.48	49.52
0516A2	400.3	19.45	23.30	26.79	24.72	22.00	8.72	2.55	3.82	2.30	5.10	11.19	13.22	13.54
0516A3	375.5	9.06	10.87	12.49	11.52	10.25	4.08	1.19	1.78	1.08	2.38	5.24	6.17	6.32
0516D1	305.6	7.16	8.58	9.85	9.09	8.10	3.23	0.94	1.41	0.85	1.88	4.13	4.87	4.99
0516E1	85.0	1.96	2.35	2.70	2.55	2.22	0.88	0.26	0.39	0.23	0.52	1.13	1.33	1.37
0516ZZ	1419.8	33.67	40.35	46.38	42.79	38.09	15.12	4.42	6.63	3.99	8.83	19.40	22.91	23.44

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 2986.3
SUM OF SUB-DRAINAGE AREAS = 2986.3

TOTAL FLOW IN = 598.46
TOTAL FLOW OUT = 595.98

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
0516A1	6	74	31.715	22	8.778				
	7	74	100.808	21	91.463				
	8	74	58.616	18	7.362				
	9	74	20.870	22	7.079				
	10	74	11.355	20	1.416				
	11	74	20.898	24	1.416				
	12	74	35.679	22	0.566				
	1	75	48.988	19	29.733				
	2	75	96.560	23	24.069				
	3	75	86.933	9	12.743	23	62.014		
	4	75	150.362	6	83.252	19	209.545		
	5	75	147.531	16	206.430				
0516A2	6	74	31.149	22	5.012				
	7	74	0.453	21	0.249				
	8	74	0.481	18	0.566				
	9	74	1.877	22	4.757				
	10	74	1.804	20	1.331				
	11	74	24.381	24	97.693				
	12	74	11.129	22	4.729				
	1	75	13.139	19	9.061				
	2	75	33.272	23	210.961				
	3	75	68.385	9	6.570	23	35.962		
	4	75	12.828	6	13.592	19	8.014		
	5	75	11.353	16	9.203				

TRIBUTARY FLOW INFORMATION FOR ARKANSAS 02/02/77

LAKE CODE 0516 GREERS FERRY RESERVOIR

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
0516A3	6	74	17.471	22	2.747				
	7	74	0.481	21	0.396				
	8	74	0.368	18	0.453				
	9	74	1.557	22	2.747				
	10	74	1.046	20	0.963				
	11	74	15.518	24	81.269				
	12	74	8.070	22	3.879				
	1	75	6.400	19	5.635				
	2	75	18.349	23	80.083				
	3	75	35.962	9	4.361	23	16.197		
	4	75	9.741	6	6.371	19	6.400		
	5	75	9.005	3	19.340	16	8.750		
0516D1	6	74	14.017	22	1.218				
	7	74	0.099	21	0.165				
	8	74	0.113	18	0.311				
	9	74	0.501	22	1.699				
	10	74	0.750	20	0.566				
	11	74	10.336	24	38.228				
	12	74	3.710	22	2.265				
	1	75	5.578	19	3.653				
	2	75	11.383	23	53.349				
	3	75	30.016	9	2.265	23	13.592		
	4	75	6.088	6	5.182	19	4.248		
	5	75	4.701						
0516E1	6	74	3.988	22	0.340				
	7	74	0.028	21	0.085				
	8	74	0.031	18	0.085				
	9	74	0.139	22	0.198				
	10	74	0.210	20	0.085				
	11	74	2.888	24	11.327				
	12	74	1.019	22	2.265				
	1	75	1.557	19	0.991				
	2	75	3.171	23	14.866				
	3	75	8.353	9	0.623	23	3.426		
	4	75	1.699	6	1.444	19	1.189		
	5	75	1.303	16	0.623				
0516Z2	6	74	65.129	22	5.663				
	7	74	0.467	21	0.453				
	8	74	0.538	18	1.416				
	9	74	2.322	22	8.495				
	10	74	3.483	20	1.699				
	11	74	48.139	24	169.901				
	12	74	17.273	22	7.079				
	1	75	25.910	19	16.990				
	2	75	52.952	23	247.772				
	3	75	139.460	9	10.619	23	67.430		
	4	75	28.317	6	24.098	19	19.822		
	5	75	21.804	3	73.086	16	10.336		

APPENDIX C

PHYSICAL AND CHEMICAL DATA

STORET RETRIEVAL DATE 77/02/02

051601
35 28 36.0 092 05 33.0 3
GREEN'S LA 3
05023 ARKANSAS

100592

/TYPA/AMBNT/LAKE

11EPALES 04001002
0195 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/27	13 30	0000	10.7		160	33	7.00	10K	0.040	0.200K	0.090	0.014
	13 30	0010	10.6	10.6		33	6.90	10K	0.030	0.200K	0.080	0.015
	13 30	0030	10.5	10.4		33	6.70	10K	0.030	0.200K	0.090	0.015
	13 30	0060	9.1	10.0		33	6.60	10K	0.030	0.200K	0.120	0.014
	13 30	0120	7.9	10.0		31	6.50	10K	0.030	0.200K	0.140	0.014
	13 30	0190	7.7	9.4		31	6.40	13	0.030	0.200K	0.150	0.014
74/06/06	09 55	0000	24.0		132	42	7.40	21	0.040	0.600	0.070	0.010
	09 55	0005	24.0	8.6		43	7.20	21	0.040	0.200	0.030	0.010
	09 55	0015	23.7	8.2		44	7.00	20	0.030	0.200	0.020	0.010
	09 55	0035	19.3	7.6		42	6.60	21	0.050	0.200K	0.050	0.009
	09 55	0050	13.7	7.2		38	6.55	21	0.040	0.200K	0.130	0.009
	09 55	0060	12.8	7.6		38	6.55	23	0.030	0.200K	0.160	0.011
	09 55	0080	11.3	8.2		36	6.50	21	0.030	0.200K	0.160	0.009
	09 55	0115	8.8	7.0		36	6.30	22	0.030	0.200K	0.180	0.009
	09 55	0130	8.5	6.4		35	6.20	23	0.020	0.200	0.200	0.010
	09 55	0195	8.4	6.4		35	6.60	22	0.020	0.200K	0.200	0.010
74/09/03	10 55	0000	25.9	7.6	180	37	6.95	19	0.040	0.500	0.030	0.003
	10 55	0010	25.8	7.4		37	7.00	17	0.050	0.400	0.020	0.003
	10 55	0025	25.8	7.8		37	7.00	20	0.040	0.400	0.020	0.002
	10 55	0039	21.9	2.8		32	6.80	14	0.040	0.300	0.020	0.003
	10 55	0075	13.7	4.8		29	6.70	18	0.040	0.400	0.140	0.003
	10 55	0110	10.9	5.2		26	6.60	18	0.040	0.400	0.200	0.003
	10 55	0150	9.4	1.2		29	6.50	21	0.060	0.200K	0.270	0.004
74/10/16	10 00	0000	20.0	7.8	240	46	7.55	16	0.030	0.400	0.020K	0.003
	10 00	0005	20.0	7.6		46	7.40	15	0.020K	0.200K	0.020K	0.002
	10 00	0035	20.0	7.8		46	7.30	13	0.020K	0.200K	0.020K	0.002K
	10 00	0049	19.7	6.4		46	7.10	13	0.020K	0.200K	0.020K	0.002K
	10 00	0070	14.6	3.4		44	6.80	14	0.020K	0.200K	0.120	0.002K
	10 00	0100	11.9	3.8		40	6.75	16	0.020K	0.200K	0.180	0.002K
	10 00	0130	10.1	0.4		45	6.60	22	0.060	0.300	0.160	0.005
	10 00	0160	9.6	0.6		51	6.60	28	0.170	0.400	0.100	0.003
	10 00	0185	9.4	0.2		55	6.60	31	0.240	0.400	0.080	0.003

C/P

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/02

051C01
35 28 36.0 092 05 33.0 3
GREERS LAKE
05023 ARKANSAS
100592

/TYPA/AMBNT/LAKE

11EPALES 04001002
0195 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/27	13 30	0000	0.010	2.2	
	13 30	0010	0.012		
	13 30	0030	0.011		
	13 30	0060	0.010		
	13 30	0120	0.010		
	13 30	0190	0.013		
74/06/26	09 55	0000	0.015	2.5	
	09 55	0005	0.012		
	09 55	0015	0.012		
	09 55	0035	0.011		
	09 55	0050	0.008		
	09 55	0060	0.008		
	09 55	0080	0.008		
	09 55	0115	0.009		
	09 55	0130	0.011		
	09 55	0195	0.010		
74/09/03	10 55	0000	0.010	2.0	
	10 55	0010	0.009		
	10 55	0025	0.009		
	10 55	0039	0.008		1.0
	10 55	0075	0.030		
	10 55	0110	0.013		
	10 55	0150	0.025		
74/10/16	10 00	0000	0.011	2.0	
	10 00	0005	0.008		
	10 00	0007			50.0
	10 00	0020			5.0
	10 00	0035	0.009		1.0
	10 00	0049	0.008		
	10 00	0070	0.006		
	10 00	0100	0.007		
	10 00	0130	0.016		
	10 00	0160	0.016		
	10 00	0185	0.016		

STORET RETRIEVAL DATE 77/02/02

051e02
35 31 00.0 092 05 40.0 3
GREER'S LP E
05023 ARKANSAS

100592

/TYPA/AMBNT/LARC

11EPALES 04001002
0116 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/27	14 15	0000	10.4		120	32	6.75	13	0.030	0.200K	0.110	0.013
	14 15	0010	10.1	10.6		32	6.70	17	0.040	0.200	0.120	0.016
	14 15	0025	10.0	10.6		32	6.90	21	0.030	0.200	0.110	0.015
	14 15	0050	9.4	10.0		34	6.90	19	0.030	0.200	0.110	0.015
	14 15	0080	8.1	10.0		31	6.50	17	0.030	0.300	0.120	0.013
	14 15	0110	7.7	9.4		31	6.40	14	0.030	0.200	0.140	0.015
74/06/06	11 00	0000	24.1		144	44	7.50	22	0.030	0.200	0.050	0.002K
	11 00	0005	24.1	8.4		44	7.30	23	0.030	0.200	0.030	0.002
	11 00	0030	23.4	8.0		42	7.10	14	0.020K	0.200	0.020	0.002K
	11 00	0035	19.0	7.2		43	6.60	15	0.040	0.300	0.070	0.002K
	11 00	0050	14.5	7.2		39	6.40	16	0.040	0.200	0.130	0.002K
	11 00	0080	10.9	7.8		37	6.40	16	0.020	0.200	0.160	0.002K
	11 00	0112	8.7	5.4		37	6.20	16	0.040	0.200	0.260	0.002K
74/09/03	11 45	0000	25.3	7.2	180	37	6.70	19	0.060	0.200	0.060	0.003
	11 45	0010	25.3	7.2		37	6.80	19	0.040	0.200	0.030	0.002
	11 45	0025	25.3	7.4		38	6.90	19	0.040	0.200	0.030	0.002
	11 45	0037	24.0	4.0		37	6.75	19	0.040	0.200	0.020	0.002
	11 45	0070	14.0	4.4		29	6.70	48	0.040	0.200	0.140	0.002
	11 45	0110	11.1	3.0		26	6.60	19	0.050	0.200K	0.210	0.002
	11 45	0130	9.5	0.6		48	6.50	35	0.320	0.600	0.060	0.009
74/10/17	14 00	0000	20.3	8.0	132	55	7.00	16	0.040	0.500	0.020	0.004
	14 00	0005	20.2	8.2		58	7.05	16	0.030	0.200K	0.020K	0.004
	14 00	0032	20.1	8.4		59	6.95	15	0.020K	0.200K	0.020K	0.004
	14 00	0055	19.9	7.6		59	6.90	17	0.020	0.200K	0.020K	0.004
	14 00	0066	15.9	2.6		47	6.40	16	0.020K	0.200K	0.120	0.004
	14 00	0080	14.1	2.6		48	6.30	15	0.020	0.200K	0.150	0.004
	14 00	0092	12.9	2.8		51	6.30	15	0.030	0.200K	0.180	0.004
	14 00	0105	11.7	0.4		57	6.35	21	0.100	0.200K	0.110	0.004

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/02

051602
35 31 00.0 092 05 40.0 3
GREERS LAKE
05023 ARKANSAS
100592

/TYPA/AMBNT/LAKE

11EPALES 04001002
0116 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/27	14	15 0000	0.011	1.8	
	14	15 0010	0.014		
	14	15 0025	0.012		
	14	15 0050	0.011		
	14	15 0080	0.011		
	14	15 0110	0.015		
74/06/06	11	00 0000	0.010	5.2	
	11	00 0005	0.012		
	11	00 0030	0.012		
	11	00 0035	0.009		
	11	00 0050	0.006		
	11	00 0080	0.004		
	11	00 0112	0.007		
74/09/03	11	45 0000	0.010	1.9	
	11	45 0010	0.010		
	11	45 0025	0.008		
	11	45 0037	0.009		1.0
	11	45 0070	0.008		
	11	45 0110	0.013		
	11	45 0130	0.033		
74/12/17	14	00 0000	0.013	3.0	
	14	00 0003			50.0
	14	00 0005	0.012		
	14	00 0018			5.0
	14	00 0032	0.011		1.0
	14	00 0055	0.011		
	14	00 0066	0.008		
	14	00 0080	0.008		
	14	00 0092	0.009		
	14	00 0105	0.016		

STORET RETRIEVAL DATE 77/02/02

051603
35 35 40.0 092 10 45.0 3
GREER'S LAKE
05023 ARKANSAS

100592

/TYPA/AMBNT/LAKE

11EPALES 04001002
0102 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/27	14	55 0000	11.5		84	35	7.00	12	0.030	0.200	0.120	0.013
	14	55 0005	11.4	10.8		33	6.90	10	0.030	0.200	0.120	0.014
	14	55 0015	10.5	10.4		33	6.80	10K	0.030	0.200	0.120	0.010
	14	55 0030	10.0	10.2		34	6.60	10K	0.030	0.200	0.120	0.011
	14	55 0060	8.5	9.4		33	6.50	11	0.050	0.200	0.170	0.011
	14	55 0095	7.9	7.8		38	6.30	16	0.080	0.300	0.160	0.014
74/06/06	11	40 0000	24.7		144	45	7.50	16	0.020	0.200	0.060	0.003
	11	40 0005	24.7	8.4		46	7.35	17	0.030	0.300	0.030	0.005
	11	40 0020	24.0	7.6		49	6.80	18	0.020	0.300	0.020	0.002
	11	40 0035	20.7	5.4		52	6.60	19	0.020	0.200	0.120	0.002
	11	40 0055	13.6	0.0		43	6.50	18	0.020	0.300	0.140	0.002
	11	40 0080	11.0	4.6		47	6.30	22	0.020	0.200	0.250	0.002
	11	40 0100	9.9	1.6		48	6.20	23	0.040	0.200	0.290	0.002
74/09/03	12	15 0000	26.0	6.8	144	40	6.70	24	0.040	0.300	0.030	0.004
	12	15 0010	26.0	6.6		40	6.75	24	0.060	0.200	0.020	0.005
	12	15 0023	25.9	6.4		40	6.75	24	0.030	0.200	0.020	0.003
	12	15 0040	19.5	1.2		32	6.55	24	0.030	0.200	0.040	0.003
	12	15 0065	14.5	1.6		35	6.50	27	0.070	0.200	0.140	0.004
	12	15 0090	12.1	0.4		56	6.50	42	0.400	0.600	0.040	0.020
74/10/17	14	55 0000	21.7	7.6	108	53	6.80	18	0.020	0.300	0.020K	0.004
	14	55 0005	20.4	7.6		53	6.75	18	0.030	0.200K	0.020K	0.004
	14	55 0020	20.1	6.8		53	6.60	18	0.020K	0.200K	0.020K	0.004
	14	55 0050	19.8	6.0		53	6.50	26	0.200	0.200K	0.020K	0.012
	14	55 0065	16.4	0.0		62	6.55	34	0.490	0.600	0.020K	0.022
	14	55 0077	14.5	0.0		82	6.60	20	0.030	0.400	0.020K	0.006
	14	55 0090	13.4	0.0		95	6.60	40	0.730	1.000	0.020K	0.017

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/02

051603
35 35 40.0 092 10 45.0 3
GREER'S LAKE
05023 ARKANSAS
100592

/TYPA/AMBNT/LAKE

11EPALES 04001002
0102 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/27	14	55 0000	0.017	2.6	
	14	55 0005	0.018		
	14	55 0015	0.010		
	14	55 0030	0.015		
	14	55 0060	0.012		
	14	55 0095	0.038		
74/06/06	11	40 0000	0.008	5.3	
	11	40 0005	0.012		
	11	40 0020	0.012		
	11	40 0035	0.012		
	11	40 0055	0.008		
	11	40 0080	0.017		
	11	40 0100	0.025		
74/09/03	12	15 0000	0.017	3.3	
	12	15 0010	0.020		
	12	15 0023	0.014		1.0
	12	15 0040	0.011		
	12	15 0065	0.026		
	12	15 0090	0.060		
74/10/17	14	55 0000	0.014	4.8	
	14	55 0004			50.0
	14	55 0005	0.014		
	14	55 0015			5.0
	14	55 0028	0.012		1.0
	14	55 0050	0.016		
	14	55 0065	0.079		
	14	55 0077	0.016		
	14	55 0090	0.135		

STORET RETRIEVAL DATE 77/02/02

051604
35 31 50.0 092 21 45.0 3
GREER'S LAKE
05141 ARKANSAS

100592

/TYPA/AMBNT/LAKE

11EPALES 04001002
0045 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/27	15	25 0000	13.9		70	25	6.60	11	0.030	0.200	0.130	0.013
	15	25 0005	11.8	10.4		24	6.55	15	0.030	0.200K	0.130	0.013
	15	25 0015	10.6	10.4		24	6.50	17	0.030	0.200K	0.110	0.012
	15	25 0025	10.3	9.8		23	6.50	17	0.040	0.200K	0.120	0.013
	15	25 0040	9.9	9.4		23	6.40	16	0.060	0.200K	0.090	0.014
74/06/06	12	10 0000	24.1		96	32	6.70	13	0.030	0.500	0.060	0.002
	12	10 0005	24.1	8.0		33	6.90	13	0.030	0.300	0.060	0.002K
	12	10 0020	24.0	7.4		34	6.70	12	0.040	0.300	0.060	0.002
	12	10 0040	17.5	4.4		29	6.25	12	0.030		0.110	0.002K
	12	10 0055	13.8	5.6		31	6.60	13	0.060	0.200	0.180	0.002K
74/09/03	12	50 0000	25.7	6.8	72	32	6.70	22	0.030	0.300	0.020	0.004
	12	50 0005	25.7	6.6		32	6.70	22	0.050	0.300	0.020	0.003
	12	50 0018	25.6	6.4		33	6.70	22	0.040	0.300	0.020	0.002
	12	50 0030	25.6	6.2		33	6.70	22	0.040	0.200	0.020	0.002
	12	50 0043	23.0	1.0		54	6.50	31	0.280	0.500	0.020	0.003
74/10/17	15	50 0000	20.4	7.6	60	47	6.85	16	0.060	0.400	0.020K	0.004
	15	50 0005	19.8	7.8		47	6.90	15	0.040	0.200	0.020K	0.004
	15	50 0016	19.6	7.4		46	6.80	14	0.040	0.200K	0.020K	0.004
	15	50 0033	19.5	7.0		46	6.80	18	0.060	0.200	0.020	0.008
	15	50 0050	19.3	7.0		46	6.70	18	0.060	0.200K	0.020K	0.005

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/02

051604
35 31 50.0 092 21 -5.0 3
GREER'S LA[illegible]
05141 ARKANSAS
100592

/TYPE/AMONT/LAKE

11EPALES 04001002
0045 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00631 INCOT LT REMNTNG PERCENT
74/03/27	15 25	0000	0.016	2.6	
	15 25	0005	0.019		
	15 25	0015	0.016		
	15 25	0025	0.016		
	15 25	0040	0.016		
74/06/06	12 10	0000	0.015	8.4	
	12 10	0005	0.013		
	12 10	0020	0.013		
	12 10	0055	0.022		
74/09/03	12 50	0000	0.016	5.2	
	12 50	0005	0.014		
	12 50	0018	0.015		1.0
	12 50	0030	0.014		
	12 50	0043	0.031		
74/10/17	15 50	0000	0.020	6.5	
	15 50	0002			50.0
	15 50	0005	0.020		
	15 50	0009			5.0
	15 50	0016	0.017		1.0
	15 50	0033	0.025		
	15 50	0050	0.035		

APPENDIX D

TRIBUTARY AND WASTEWATER TREATMENT PLANT DATA

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

351641
35 30 50.0 091 57 45.0
LITTLE RED RIVER
05 CLEBURNE CO ARK
0/GREERS FERRY RESERVOIR
BANK SAMPLE 2.2 M SE OF GREERS FERRY DAM
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	17	05	0.148	0.900	0.060	0.005K	0.005K
74/07/21	12	08	0.152	0.100K	0.007	0.005	0.015
74/08/18	11	15	0.140	0.200	0.035	0.015	0.015
74/09/22	12	30	0.160	0.100K	0.020	0.005K	0.005K
74/10/20	15	00	0.160	1.100	0.090	0.005K	0.005
74/11/24	14	35	0.336	0.500	0.064	0.020	0.040
74/12/22	11	00	0.088	0.300	0.040	0.005K	0.010K
75/01/19	14	00	0.072	0.310	0.040	0.007	0.010
75/02/23	13	45	0.080	0.300	0.040	0.008K	0.020
75/03/09	16	00	0.084	0.300	0.014	0.008K	0.035
75/03/23	15	10	0.092	0.100	0.008	0.008	0.010K
75/04/06	13	20	0.280	1.350	0.015	0.005K	0.010K
75/04/19	17	04	0.105	0.550	0.020	0.005K	0.010
75/05/16	10	56	0.125	2.000	0.055	0.005K	0.010K

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

051641
35 30 50.0 091 57 45.0
LITTLE RED RIVER
05 CLEBURNE CO ARK
0/GREERS FERRY RESERVOIR
BANK SAMPLE 2.2 M SE OF GREERS FERRY DAM
11ERALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	17 05		0.148	0.900	0.060	0.005K	0.005K
74/07/21	12 06		0.152	0.100K	0.007	0.005	0.015
74/08/18	11 15		0.140	0.200	0.035	0.015	0.015
74/09/22	12 30		0.160	0.100K	0.020	0.005K	0.005K
74/10/20	15 00		0.160	1.100	0.050	0.005K	0.005
74/11/24	14 35		0.336	0.500	0.064	0.020	0.040
74/12/22	11 00		0.084	0.300	0.040	0.005K	0.010K
75/01/19	14 30		0.072	0.310	0.040	0.007	0.010
75/02/23	14 45		0.080	0.300	0.040	0.008K	0.020
75/03/09	16 00		0.084	0.300	0.014	0.008K	0.035
75/03/23	15 10		0.092	0.100	0.008	0.008	0.010K
75/04/06	13 20		0.280	1.350	0.015	0.005K	0.010K
75/04/19	17 04		0.105	0.550	0.020	0.005K	0.010
75/05/16	10 56		0.125	2.000	0.055	0.005K	0.010K

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/26
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

051642
35 38 50.0 092 14 30.0
LITTLE RED RIV (N FORK)
05 VAN BUREN CO MAP
T/GREERS FERRY RESERVOIR
BANK SAMPLE 4.2 MI NE OF JCT WITH HWY 16
11ERALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	15	00	0.012	0.100K	0.010	0.005	0.016
74/07/21	10	16	0.004	0.425	0.069	0.005	0.041
74/08/18	10	45	0.008	1.300	0.035	0.015	0.050
74/09/22	10	47	0.016	0.200	0.010	0.005K	0.025
74/10/20	12	30	0.032	0.400	0.020	0.005	0.020
74/11/24	12	15	0.040	0.400	0.040	0.010	0.080
74/12/22	09	30	0.016	0.200	0.016	0.007	0.030
75/01/19	12	00	0.040	0.150	0.016	0.015	0.035
75/02/23	13	15	0.096	0.200	0.008	0.008K	0.010
75/03/09	12	00	0.048	0.700	0.028	0.008K	0.040
75/03/23	13	25	0.100	0.700	0.016	0.016	0.040
75/04/06	11	10		0.700	0.010	0.005K	0.020
75/04/19	15	34	0.010	0.525	0.025	0.015	0.020
75/05/16	08	35	0.115	1.000	0.030	0.005	0.010K

K VALUE KNOWN TO BE LESS THAN — INDICATED —

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

351643
35 35 29.0 092 27 20.0
LITTLE RE RIV (S FORK)
05 VAN BUREN CO ARK
T/GREERS FERRY RESERVOIR
BRDG IN US RT 65 AT CLINTON
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	11	25	0.020	0.100K	0.020	0.005K	0.010
74/07/21	09	05	0.008	0.100	0.015	0.005	0.025
74/08/18	08	55	0.008	0.500	0.040	0.020	0.025
74/09/22	08	40	0.008	0.100K	0.015	0.005K	0.005K
74/10/20	10	15	0.032	0.200	0.115	0.010	0.010
74/11/24	10	20	0.056	0.600	0.048	0.005	0.090
74/12/22	08	15	0.240	0.100	0.045	0.005K	0.010K
75/01/19	10	30	0.464	0.400	0.112	0.005K	0.010
75/02/23	10	30	0.072	0.300	0.016	0.008K	0.020
75/03/09	10	15	0.163	0.200	0.016	0.042	0.087
75/03/23	12	35	0.080	0.800	0.024	0.008	0.020
75/04/06	10	20	0.050	0.925	0.005K	0.005K	0.020
75/04/19	14	00	0.035	0.550	0.050	0.010	0.020
75/05/03			0.790	0.750	0.010	0.005K	0.020
75/05/16	13	33	0.015	1.750	0.035	0.005K	0.020

— K VALUE KNOWN TO BE LESS THAN INDICATED —

45

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0516A4
35 34 30.0 092 26 00.0
LITTLE RED RIVER
05 VAN BUREN CO ARK
T/GREERS FERRY
END OF COUNTY RD 1.25 MI S OF CLINTON
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME	DEPTH OF DAY	FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	12	40		0.004	0.600	0.020	0.005K	0.035
74/07/21	08	40		0.004	0.400	0.020	0.010	0.050
74/08/18	08	45		0.160	1.100	0.055	0.030	0.115
74/09/22	08	20		0.032	0.200	0.060	0.020	0.030
74/10/20	10	00		0.112	0.600	0.140	0.035	0.090
74/11/24	10	00		0.056	0.400	0.024		0.070
74/12/22	08	00		0.048	0.300	0.080	0.020	0.020
75/01/19	09	00		0.048	0.400	0.080	0.025	0.025
75/02/23	10	00		0.080	0.200	0.032	0.016	0.020
75/03/09	10	00		0.032	0.500	0.056	0.008	0.060
75/03/23	11	45		0.080	0.600	0.024	0.008	0.020
75/04/06	10	00		0.025	0.400	0.005	0.005K	0.010K
75/04/19	13	16		0.020	0.300	0.020	0.005	0.020
75/05/16	18	04		0.015	1.200	0.035	0.005K	0.010K

K VALUE KNOWN TO BE LESS THAN INDICATED

D-6

START RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

351601
35 38 30.0 092 01 45.0
BEECH CREEK
05 CLEBURNE CO MAP
T/GREERS FERRY RESERVOIR
BANK SAMPLE 3.2 MI SE OF HEADROW
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	16	10	0.016	0.800	0.045	0.005K	0.010
74/07/21	11	10	0.004	1.300	0.055	0.015	0.025
74/08/18	11	00	0.084	0.600	0.035	0.015	0.025
74/09/22	11	40	0.016	0.200	0.020	0.005K	0.005K
74/10/20	14	00	0.024	0.300	0.015	0.005K	0.010
74/11/24	13	45	0.112	0.400	0.080	0.055	0.070
74/12/22	13	30	0.072	0.400	0.015	0.005	0.010K
75/01/19	13	00	0.104	0.500	0.048	0.005K	0.010
75/02/23	14	00	0.104	0.300	0.016	0.008K	0.010
75/03/09	15	00	0.204	0.700	0.024	0.008K	0.030
75/03/23	14	20	0.140	0.200	0.008	0.008	0.010
75/04/06	12	30	0.065	0.450	0.010	0.005K	0.010K
75/04/19	16	27	0.020	0.600	0.020	0.005	0.030
75/05/16	09	47	0.370	2.400	0.195	0.005K	0.010K

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

051601
35 25 20.0 092 27 40.0
ARCHEY CREEK
05 VAN BUREN CO MAP
T/GREERS FERRY RESERVOIR
BRDG ON HWY 65 1 MI N OF CLINTON
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	11 30		0.009	0.100	0.010	0.005K	0.010
74/07/21	09 21		0.004	0.200	0.015	0.005K	0.020
74/08/18	09 30		0.004	0.900	0.050	0.015	0.015
74/09/22	09 30		0.016	0.400	0.035	0.005K	0.015
74/10/27	11 00		0.024	0.100K	0.025	0.005K	0.005
74/11/24	10 45		0.048	0.400	0.032	0.010	0.050
74/12/22	08 30		0.024	0.100	0.020	0.005K	0.010K
75/01/19	10 40		0.032	0.700	0.088	0.005K	0.010K
75/02/23	11 30		0.072	0.200	0.024	0.008K	0.020
75/03/09	10 40		0.028	0.200	0.024	0.008K	0.030
75/03/23	12 15		0.056	0.200	0.016	0.008K	0.010
75/04/06	10 30		0.280	0.350	0.010	0.005K	0.020
75/04/19	14 12		0.015	0.550	0.030	0.005	0.030

— K VALUE KNOWN TO BE LESS THAN INDICATED —

D-8

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

351661
35 35 20.0 092 24 55.0
REE DEE CREEK
05 VAN BUREN CO ARK
T/GREERS FERRY RESERVOIR
BRDG ON GRAVEL RD 3.6 MI E OF CLINTON
11EPALES 7111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	13 30		0.004	0.900	0.040	0.005K	0.015
74/07/21	09 35		0.024	0.300	0.010	0.010	0.040
74/08/18	09 50		0.192	0.900	0.065	0.010	0.030
74/09/22	09 40		0.016	0.200	0.030	0.005	0.005
74/10/20	11 15		0.048	0.300	0.020	0.005K	0.010
74/11/24	11 00		0.112	0.300	0.040	0.005	0.040
74/12/22	08 45		0.080	0.400	0.030	0.005K	0.010K
75/01/19	11 00		0.088	0.200	0.048	0.005K	0.010K
75/02/23	12 00		0.112	0.500	0.040	0.008K	0.010
75/03/09	11 00		0.048	0.200	0.016	0.008K	0.040
75/03/23	12 25		0.092	0.300	0.016	0.008	0.010
75/04/06	10 40			1.300	0.270	0.005K	0.020
75/04/19	14 20		0.004	0.200	0.010	0.005K	0.040
75/05/18	19 15		0.120	0.250	0.022	0.005K	0.010

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

351651
35 35 00.0 092 18 00.0
UNNAMED STREAM
05 VAN BUREN CO MAP
T/GREERS FERRY
100 YDS BLW HIDDEN VLY TRTMENT PLANT
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	10 00		3.500	0.400	0.015	0.375	0.410
74/07/21	10 30		27.200	0.400	0.042	1.900	2.000
74/08/18	10 25		12.300	1.400	0.045	2.000	2.100
74/09/22	10 16		2.160	1.000	0.045	0.700	0.720
74/10/20	12 00		1.120	0.200	0.020	0.410	0.440
74/11/24	11 30		0.192	0.600	0.032	0.025	0.075
74/12/22	09 06		0.810	1.700	0.055	0.140	0.200
75/01/19	11 30		0.192	0.200	0.056	0.015	0.030
75/02/23	12 30		0.104	0.400	0.032	0.008K	0.010
75/03/09	11 30		0.835	0.600	0.036	0.192	0.260
75/03/23	12 55		0.116	0.800	0.024	0.016	0.020
75/04/06	11 25		0.347	1.250	0.053	0.075	0.090
75/04/19	15 00		0.100	0.450	0.100	0.040	0.070
75/05/16	08 01		1.050	0.800	0.030	0.165	0.190

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

05164A PD05164A P001027*
35 34 30.0 092 26 35.0
CLINTON
05 VAN BUREN CO ARK
T/GREERS FERRY RESERVOIR
S FK LITTLE RED RIVER
ILEPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
74/11/06	11	00							
CP(T)-			0.080	28.000	11.500	3.450	5.100	0.500	0.400
74/11/06	16	30							
75/01/23	11	00							
CP(T)-			0.080	30.500	16.800	3.950	5.100	0.500	0.500
75/01/23	16	00							
75/02/20	11	00							
CP(T)-			0.080	28.000	14.500	3.600	4.500	0.500	0.375
75/02/20	16	30							
75/03/12	11	00							
CP(T)-			0.080	27.000	16.000	3.680	4.900	0.500	0.400
75/03/12	16	00							
75/04/11	11	00							
CP(T)-			0.050	21.000	11.000	2.800	3.900	0.500	0.300
75/04/11	16	00							
75/04/25	11	00							
CP(T)-			0.050	30.000	17.300	3.600	4.800	0.500	0.400
75/04/25	16	00							
75/05/17	11	00							
CP(T)-			0.050	36.000	14.500	3.000	4.440	0.500	0.600
75/05/17	24	00							
75/06/12	11	00							
CP(T)-			0.050	28.000	14.000	3.500	5.400	0.500	0.400
75/06/12	15	00							
75/06/24	11	00							
CP(T)-			0.025	31.000	13.500	3.300	5.100	0.500	0.600
75/06/24	16	00							
75/07/01	11	00							
CP(T)-			0.025	33.000	8.300	3.200	6.000	0.500	0.600
75/07/01	15	30							
75/07/30	11	00							
CP(T)-			0.025	48.000	10.500	4.700	8.500	0.500	0.400
75/07/30	16	00							

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STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

051631 TF051631 P001000
35 33 30.0 092 17 30.0
FAIRFIELD BAY
05 VAN BUREN CO MAP
D/GREERS FERRY RESERVOIR
GREERS FERRY RESERVOIR
11ERALGS 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
74/11/05	14 00		1.840	1.000K	0.050K	0.600	0.618	0.020	0.015
75/01/06	11 00		3.040	8.600	0.080	0.660	0.788	0.014	0.016
75/02/03	14 00		0.960	1.000K	0.080K	0.240	0.400	0.020	0.017
75/03/03	11 00		2.960	1.000K	0.080	0.780	0.910	0.012	0.015
75/04/02	13 30		0.080	1.300	0.080K	0.080K	0.340	0.025	0.020
75/04/16	14 00		4.100	2.100	0.900	2.100	2.300	0.100	0.120
75/05/01	14 00		6.400	2.600	0.770	6.800	7.200	0.085	0.100
75/05/19	12 30		12.000	2.700	0.560	4.600	4.400	0.100	0.100
75/06/03	13 00		4.900	2.600	1.600	3.300	3.800	0.080	0.100
75/06/17	14 00		11.000	4.900	1.150	2.700	3.000	0.120	0.100
75/07/01	14 00		7.800	2.300	0.455	6.700	6.900	0.100	0.100
75/07/16	11 00		10.500	3.500	1.150	9.100	9.100	0.100	0.100

— K VALUE KNOWN TO BE LESS THAN INDICATED —

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APPENDIX E

PARAMETRIC RANKINGS OF LAKES SAMPLED BY NES IN 1974

STATE OF ARKANSAS

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500- MEAN SEC	MEAN CHLORA	15- MIN DO	MEDIAN DISS ORTHO P
0501	BEAVER LAKE	0.022	0.330	415.667	3.921	14.900	0.006
0502	BLACKFISH LAKE	0.424	1.470	496.125	19.775	12.000	0.090
0503	BLUE MOUNTAIN LAKE	0.058	0.160	484.000	8.983	14.600	0.010
0504	BULL SHOALS LAKE	0.015	0.380	343.969	3.995	15.000	0.004
0505	LAKE CATHERINE	0.029	0.180	451.667	14.042	11.800	0.006
0506	LAKE CHICOT	0.162	0.450	486.000	13.722	14.800	0.089
0507	DEGRAY RESERVOIR	0.019	0.130	419.050	12.300	15.000	0.004
0508	LAKE ERLING	0.054	0.120	454.667	13.389	14.600	0.020
0509	GRAND LAKE	0.101	0.090	479.667	62.967	8.400	0.021
0510	LAKE HAMILTON	0.024	0.130	428.111	10.889	14.400	0.006
0511	MILLWOOD LAKE	0.040	0.120	466.778	14.967	9.800	0.008
0512	NIMROD LAKE	0.039	0.160	469.000	15.833	8.800	0.006
0513	NORFOLK LAKE	0.015	0.320	356.321	3.441	15.000	0.005
0514	LAKE OUACHITA	0.015	0.155	389.144	4.344	15.000	0.006
0515	TABLE ROCK LAKE	0.022	0.350	410.778	9.103	15.000	0.007
0516	GREER'S LAKE	0.012	0.140	370.875	3.762	15.000	0.004

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500= MEAN SEC	MEAN CHLOPA	15= MIN DO	MEDIAN DISS ORTHO P
0501	BEAVER LAKE	53 (9)	27 (4)	67 (10)	87 (13)	40 (6)	63 (9)
0502	BLACKFISH LAKE	0 (0)	0 (0)	0 (0)	7 (1)	73 (11)	0 (0)
0503	BLUE MOUNTAIN LAKE	20 (3)	47 (7)	13 (2)	67 (10)	57 (8)	27 (4)
0504	BULL SHOALS LAKE	90 (13)	13 (2)	100 (15)	80 (12)	17 (0)	93 (13)
0505	LAKE CATHERINE	47 (7)	40 (6)	47 (7)	27 (4)	80 (12)	63 (9)
0506	LAKE CHICOT	7 (1)	7 (1)	7 (1)	33 (5)	47 (7)	7 (1)
0507	DEGRAY RESERVOIR	73 (11)	77 (11)	60 (9)	47 (7)	17 (0)	93 (13)
050H	LAKE ERLING	27 (4)	90 (13)	40 (6)	40 (6)	57 (8)	20 (3)
0509	GRAND LAKE	13 (2)	100 (15)	20 (3)	0 (0)	100 (15)	13 (2)
0510	LAKE HAMILTON	53 (8)	77 (11)	53 (8)	53 (8)	67 (10)	63 (9)
0511	MILLWOOD LAKE	33 (5)	90 (13)	33 (5)	20 (3)	87 (13)	33 (5)
0512	NIMROD LAKE	40 (6)	53 (8)	27 (4)	13 (2)	93 (14)	67 (7)
0513	NORFOLK LAKE	80 (12)	33 (5)	93 (14)	100 (15)	17 (0)	80 (12)
0514	LAKE OUACHITA	90 (13)	60 (9)	80 (12)	73 (11)	17 (0)	63 (9)
0515	TABLE ROCK LAKE	63 (9)	20 (3)	73 (11)	60 (9)	17 (0)	40 (6)
0516	GREER'S LAKE	100 (15)	67 (10)	87 (13)	93 (14)	17 (0)	93 (13)